



# Armed Forces College Of Medicine

## AFCM



# Acute Red Eye

# ILOs

By the end of this section the student can:

1. Enumerate the **causes** of acute red eye
2. Describe the **clinical features** of each entity
3. Differentiate the underlying cause
4. Select the appropriate **investigation**
5. Primary **manage** acute red eye
6. Solve **clinical problems** related to acute red eye

# Causes of acute red eye

- Acute conjunctivitis
- Acute anterior uveitis/endophthalmitis
- Acute angle closure glaucoma
- Acute keratitis
- Endo / Panophthalmitis
- Acute orbital cellulitis (to be discussed with orbit)

# Acute red eye

- A **10-year** old presents with bilateral red eyes that started **yesterday**. Both eyes are very red with **sticky** discharge **gluing** the lashes together. There is **no photophobia**. **cornia** **تمام** After washing the discharge **vision** is 6/6 OU and pupils are normal and reactive.
- A **20-year-old** military recruit wakes up with markedly red and tearing right eye. He had sore throat for 3 days. On examination the eye is very red with profuse lacrimation and mild photophobia. Vision is 6/6, pupil normal and reactive. There is right preauricular tenderness and enlarged lymph node. **viral**

# Acute conjunctivitis

- Acute conjunctivitis is a very common cause of red eyes. It is the most common ocular presentation
- It can be infective or non-infective (acute allergy, chemical irritants, eye-drops, soaps and even self-inflicted)
- Infective may be bacterial, viral or fungal
- It is generally **self-limited** except if severe and involves the cornea (photophobia) 5-7 day
- Vision is unaffected unless the cornea is involved

# Acute Bacterial Conjunctivitis

- Very common in children
- Starts in one eye and the other eye next day or 2
- Discharge is usually **mucoid** or **mucopurulent**,  
**sticky and glues** the lashes
- Virulent organisms as gonococcus and  
pneumococcus can cause **purulent** forms which  
are more severe and can cause **corneal ulceration**
- Diphtheria can cause **membranous** conjunctivitis  
in non-immunized
- Treatment is by **broad-spectrum antibiotics** for 5-  
7 days
- **Intramuscular ceftriaxone 1gm** is given in  
**gonococcal** cases
- Diphtheria will require **specific anti-toxin injection**



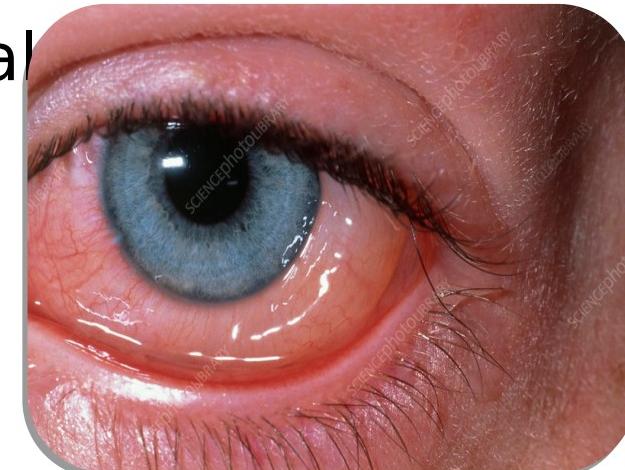
# Viral conjunctivitis

- Very common
- Appears in epidemic form in boarding schools, hospitals and military camps
- Starts unilateral, other eye follows in 5-7 days
- Discharge is **watery** with **mild photophobia** because of associated keratitis
- Common virus is **ADENOVIRUS** (epidemic keratoconjunctivitis) but can occur in measles, chickenpox and others
- **Hemorrhagic** in hemorrhagic fevers as Ebola and dengue
- Treatment is **supportive, no specific treatment**
- Adenovirus may cause corneal complication that lasts several months (**subepithelial infiltrates**)  
• الناخذ الصبغة  
تاختد الصبغة ulcer



# Acute allergic conjunctivitis

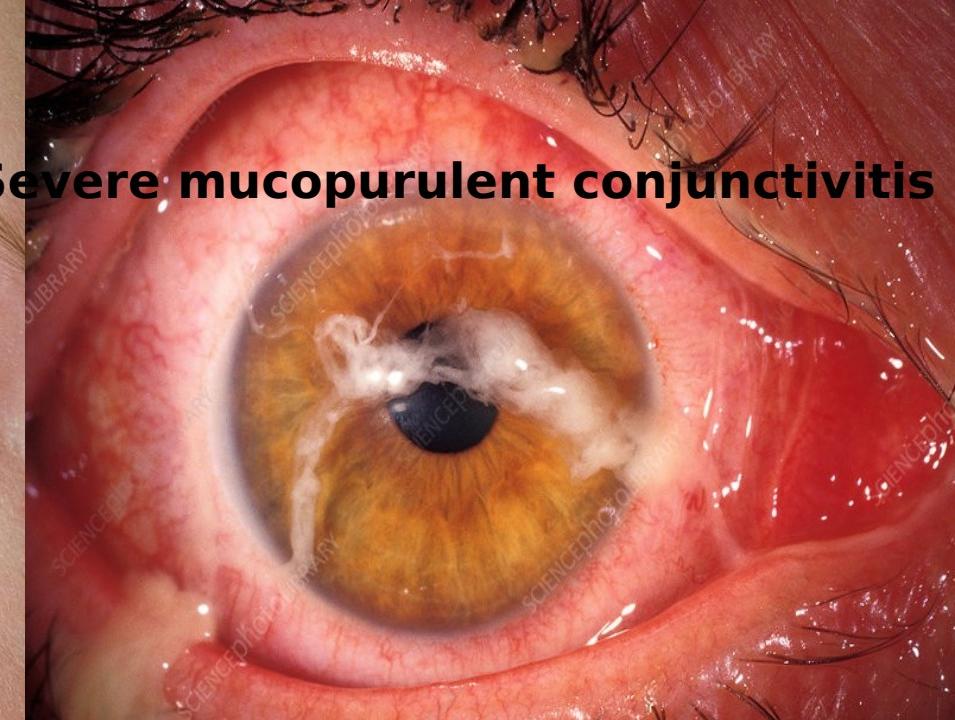
- Another common cause that can occur acutely in those with specific allergies to some foods are fish, eggs, flowers etc. also some systemic medications
- Topical drug allergies esp. glaucoma drops are other common causes
- Usually **lid edema** and conjunctival **chemosis** are marked and the discharge is watery **ecchemosis**
- **Itching** may be prominent



Bacterial conjunctivitis



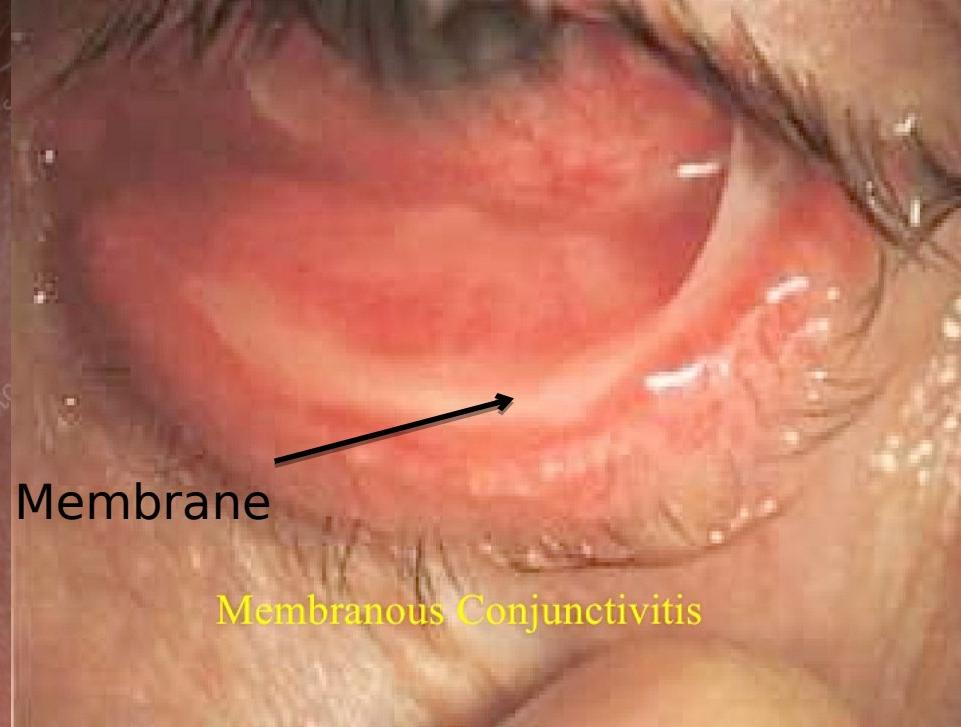
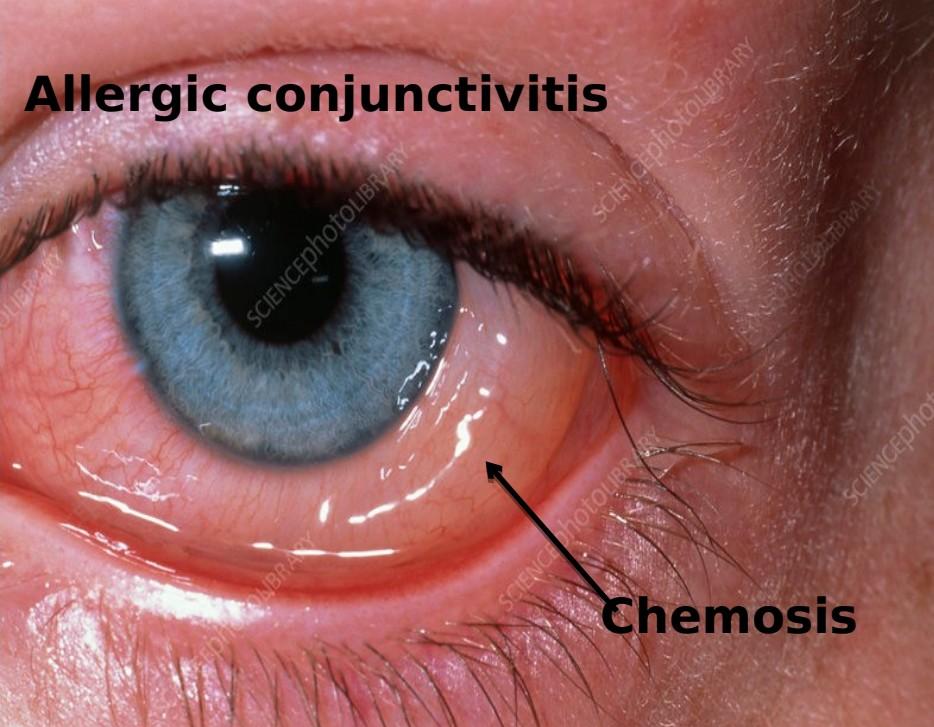
**Severe mucopurulent conjunctivitis**



Viral conjunctivitis



## Allergic conjunctivitis



# Acute iridocyclitis: acute anterior uveitis

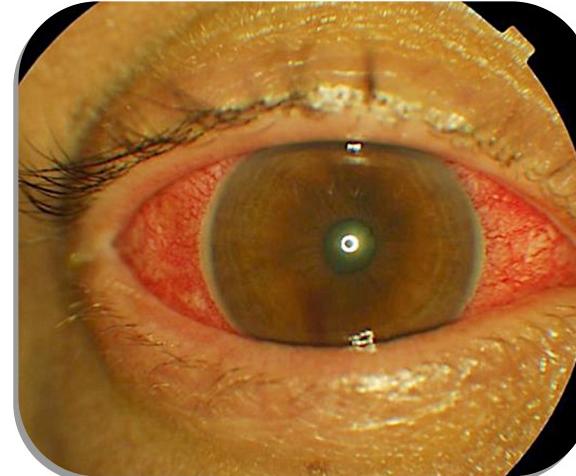
- A 16-year-old male has pain and redness in his right eye since 2 days. His vision is **blurred with black spots** in front of his eye. He cannot face the light. This is his first attack.
- On examination vision of the right eye is 6/18 and the left eye is 6/60. the right eye is 2mm and the left 4mm. On the slit lamps there are many cellular deposits on the back of the cornea and the aqueous humor is turbid with many cells. The fundus cannot be clearly seen

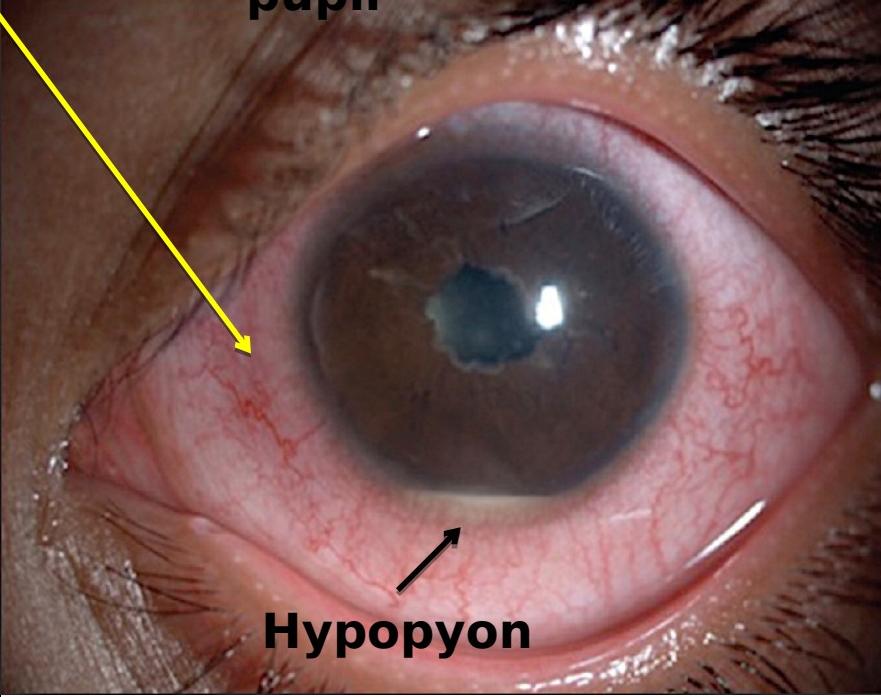
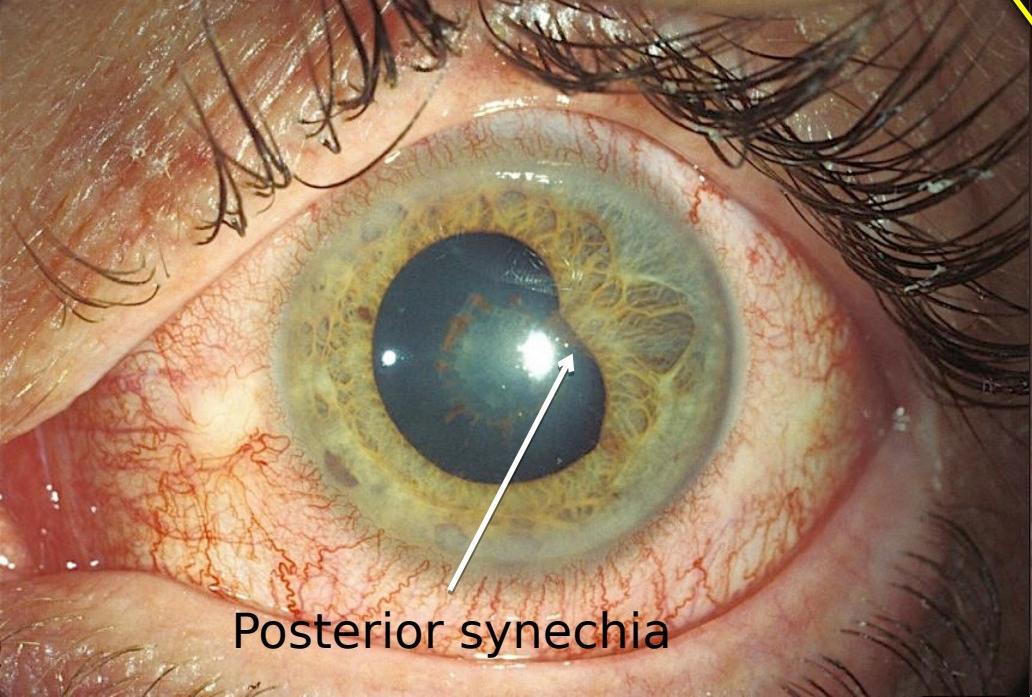
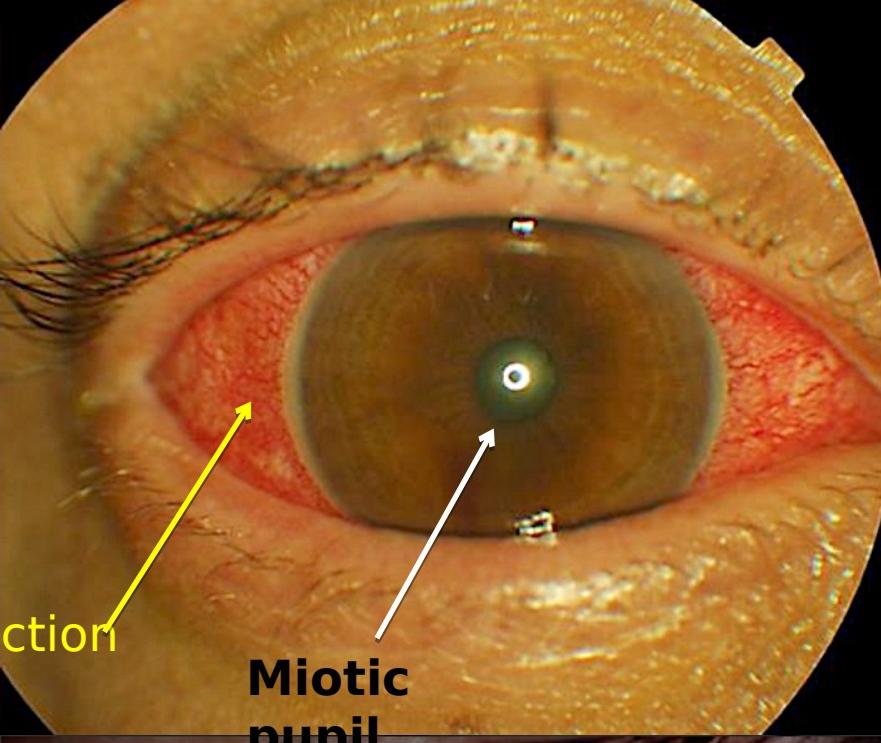
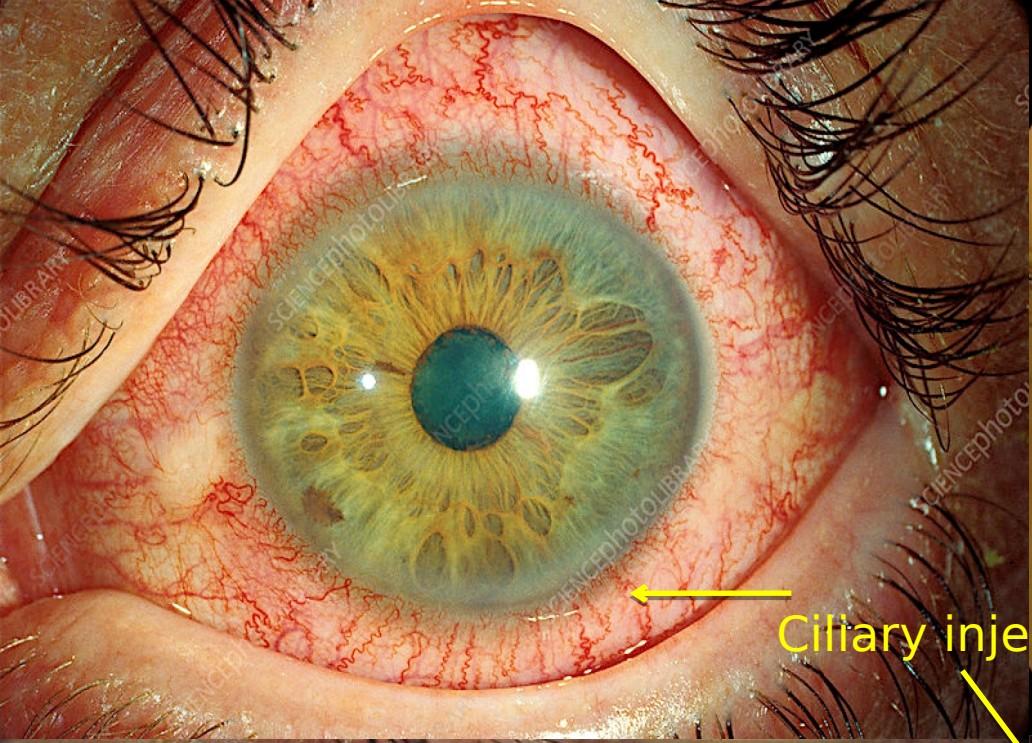
# Acute iridocyclitis: acute anterior uveitis

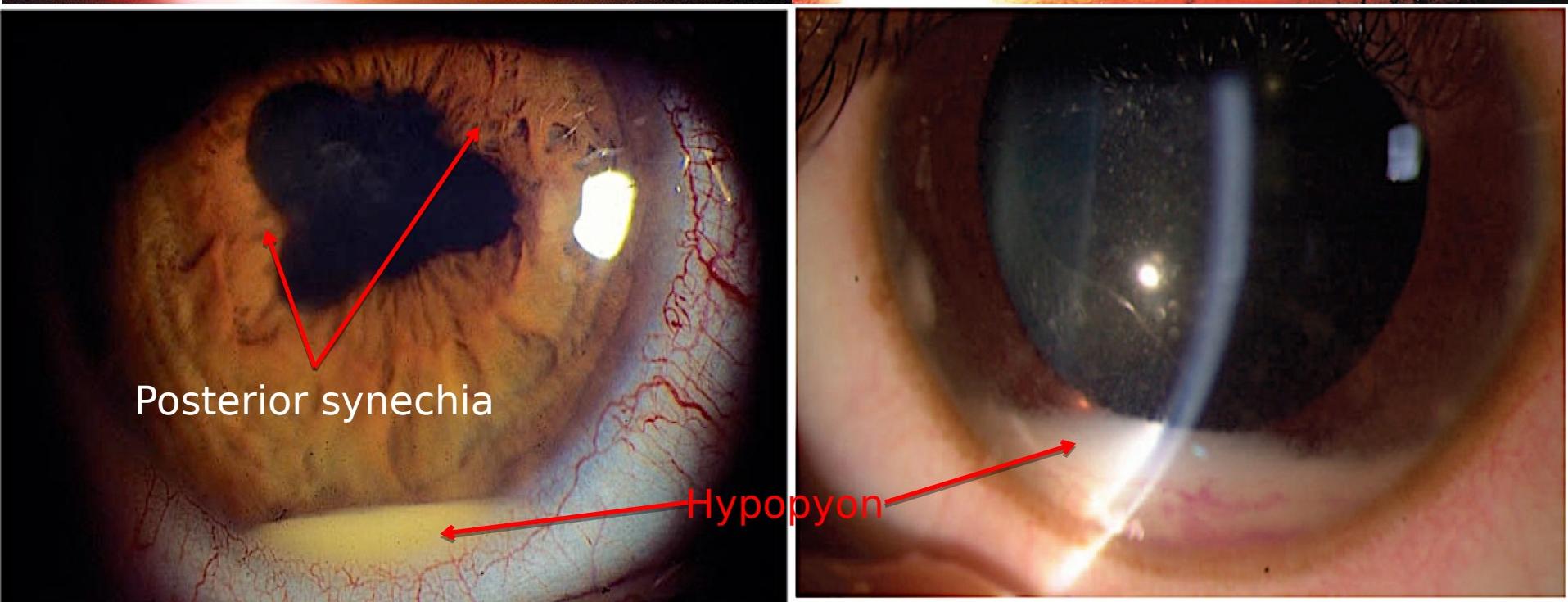
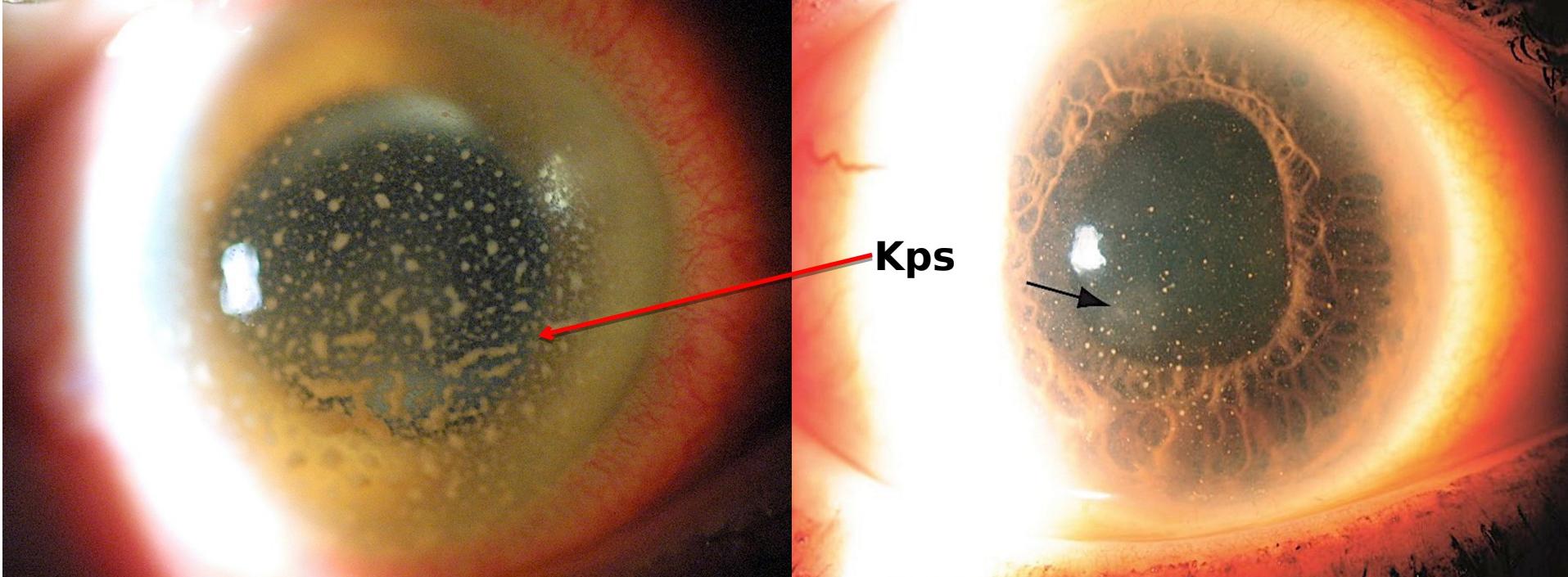
- Acute anterior uveitis can occur at any age and has many causes
- Common causes are
  - Young female: acute non-specific iritis, pauci-articular juvenile rheumatoid (Idiopathic) arthritis
  - Young male: HLA-B27 related uveitis, ankylosing spondylitis, Behçet's disease
  - Middle-aged: Behçet, non-specific, herpetic, Sarcoidosis
  - **Postoperative** is common at all ages
  - **Above 60** acute anterior uveitis is **uncommon**
- The patient has acute onset of unilateral or bilateral red eye with pain, headache, photophobia and blurring of vision

# Acute iridocyclitis: acute anterior uveitis

- The suggestive symptoms are
  - Strong photophobia and brow-ache with light
  - Black moving spots
  - Presence of systemic manifestations as
    - Oro-genital ulcers: Behcet
    - Arthritis: JRA
    - Back pain: AS
    - Cough: sarcoid, TB
- The suggestive signs are
  - Ciliary injection artery
  - Small pupil
  - Aqueous flare
  - Keratic precipitates (kps)
  - Hazy iris details (aqueous flare and cells)

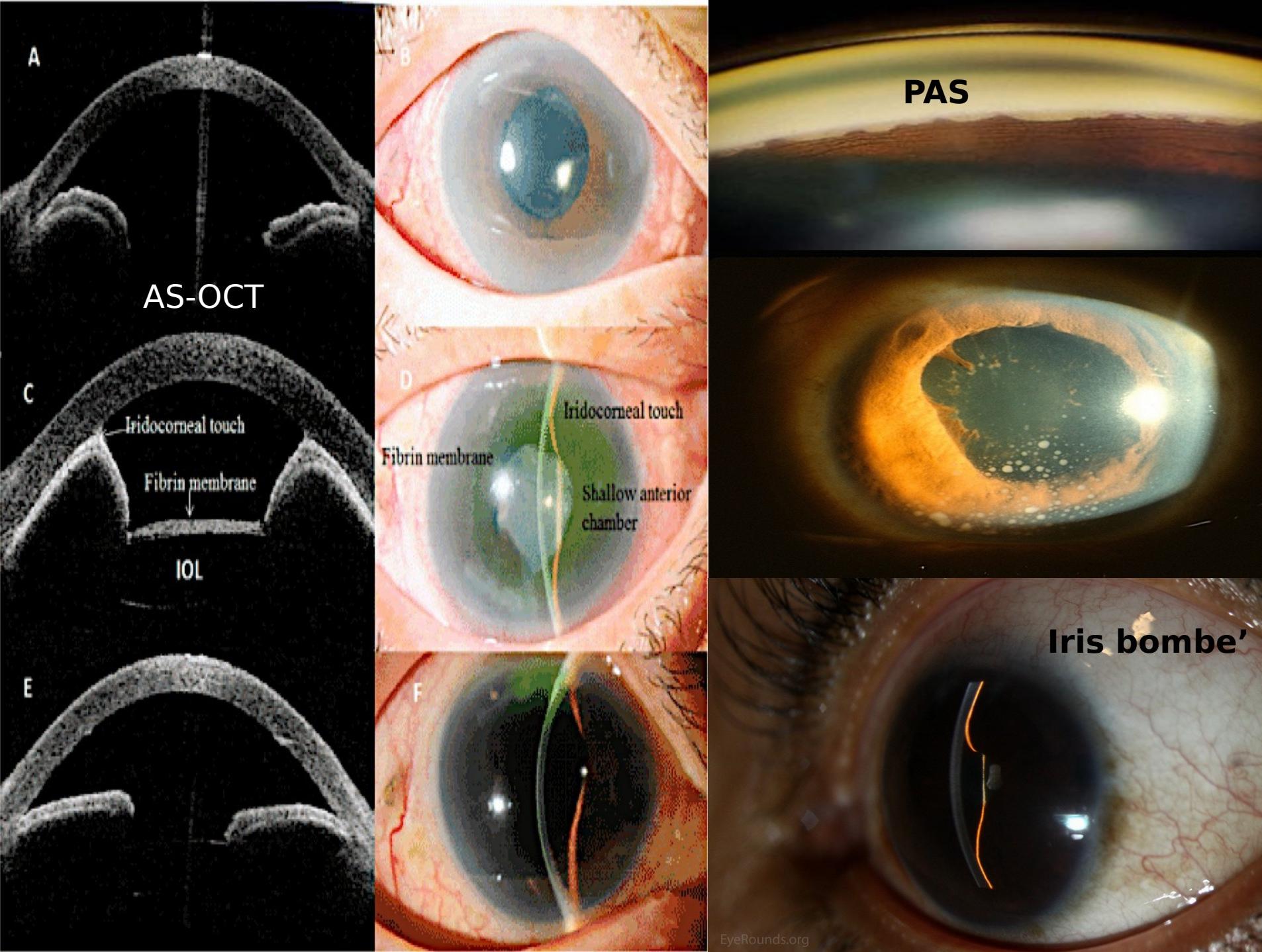






# Acute iridocyclitis: acute anterior uveitis

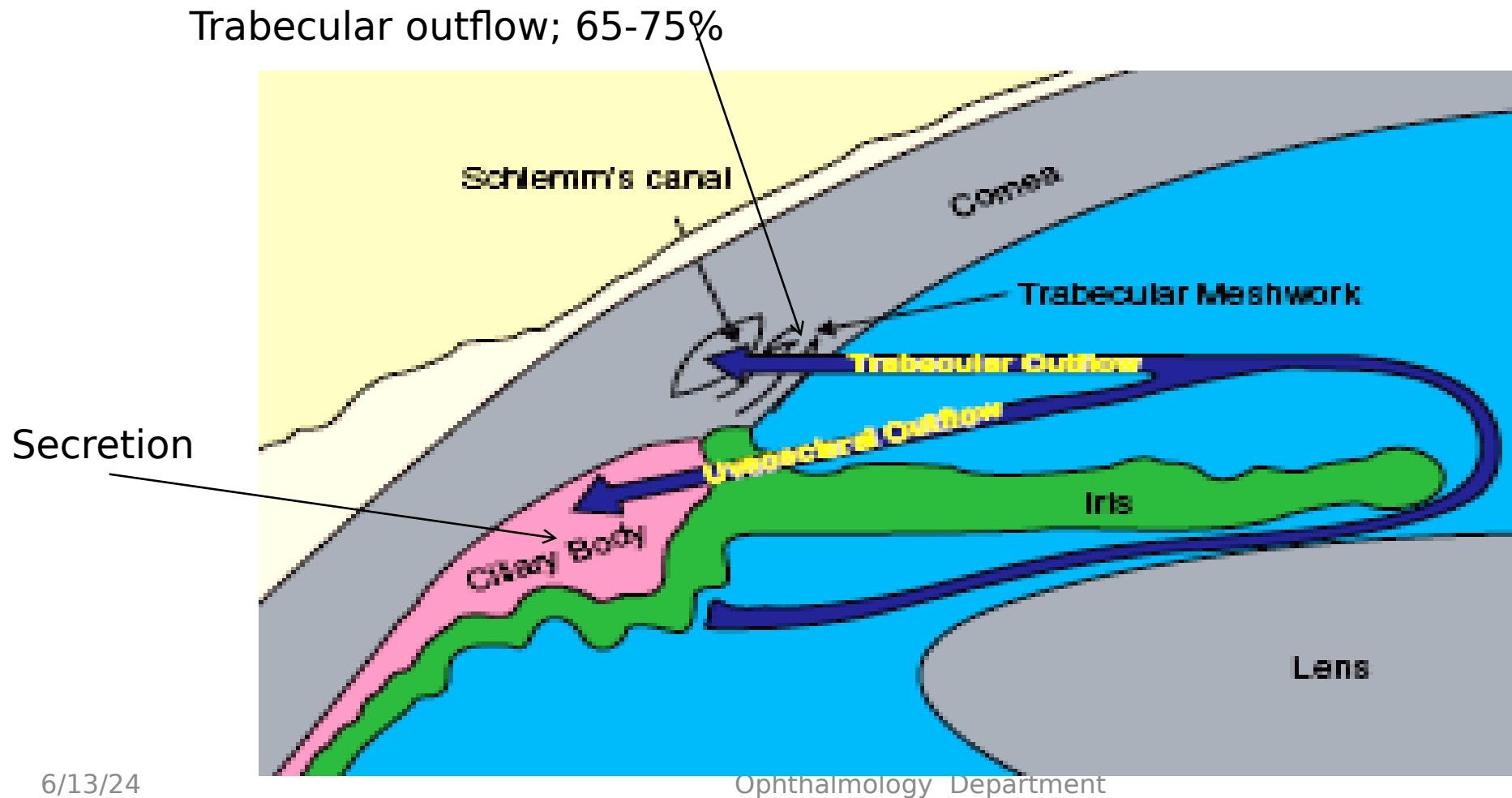
- The most important complications
  - **Synechia** (iris adhesions)
    - To the lens → posterior synechia → **occlusio-pupillae**
    - To the angle → peripheral anterior synechia (PAS)
  - **Secondary glaucoma**
  - **Complicated cataract**: with recurrent attacks or steroid therapy
- Investigation: for underlying systemic disease
- The treatment
  - ALWAYS DILATE THE PUPIL: **Atropine/cyclopentolate**
  - **Topical steroids**: frequent and withdraw gradually
  - Investigate for a systemic cause: IN RECURRENT CASES.
  - **ORAL** and **INJECTABLE steroids/NSAID** if vision is threatened



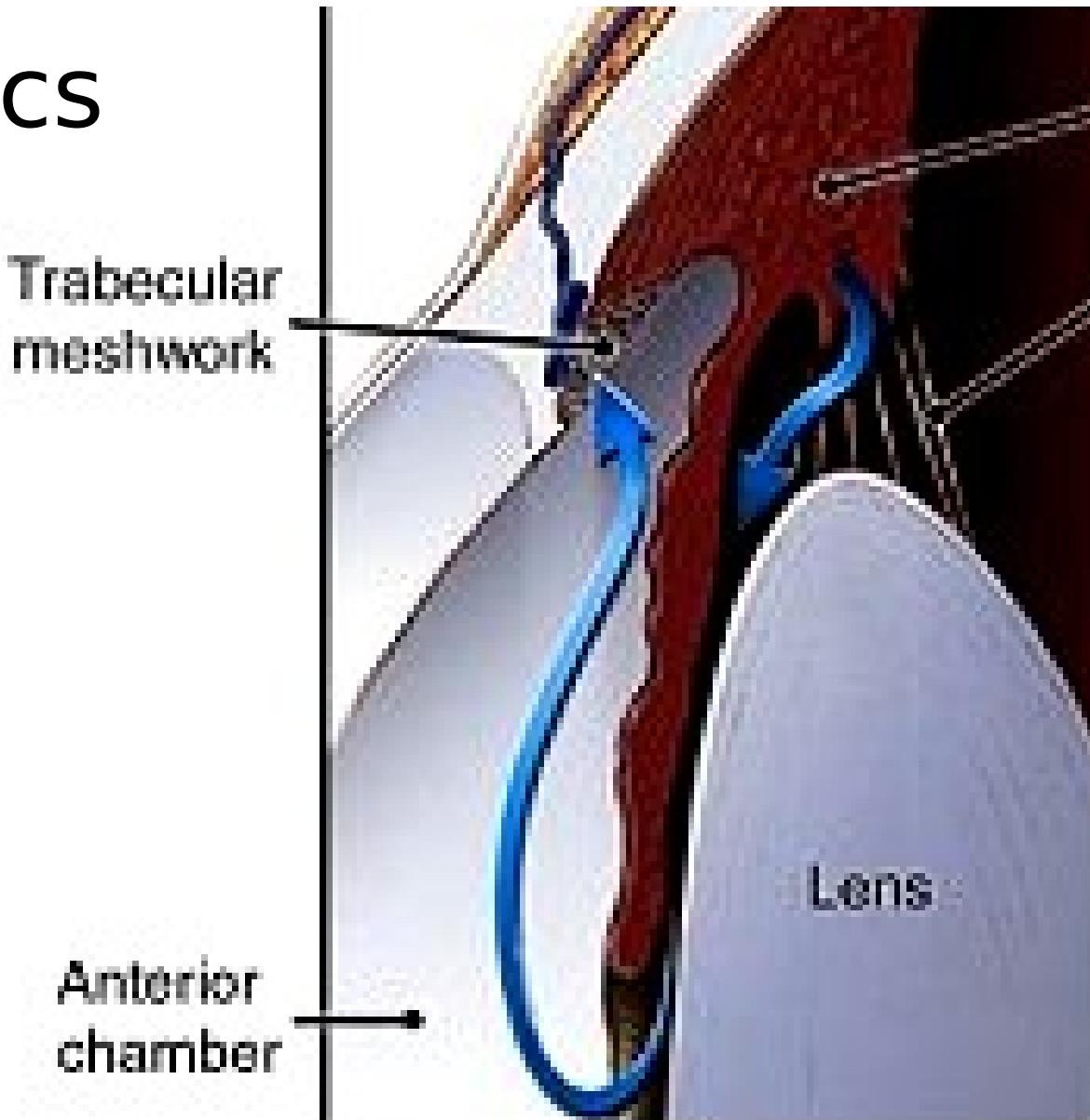
# Acute Glaucoma

- A **50-year-old female** has severe right eye pain and headache in the middle of the night. She has been **crying** all afternoon for loss of her husband. On examination vision in the right eye is HM, eye is very **congested**, cornea **hazy**, AC is **shallow**, pupil is **dilated** vertically **oval** and not reactive to light, tension is stony hard.
- She is admitted to hospital and given intravenous **Mannitol**

# Aqueous Circulation

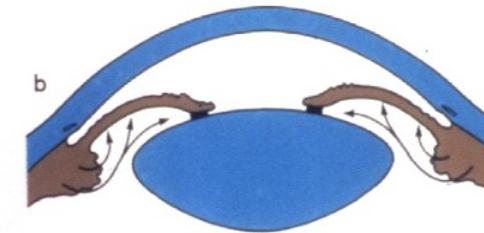


# Aqueous Dynamics

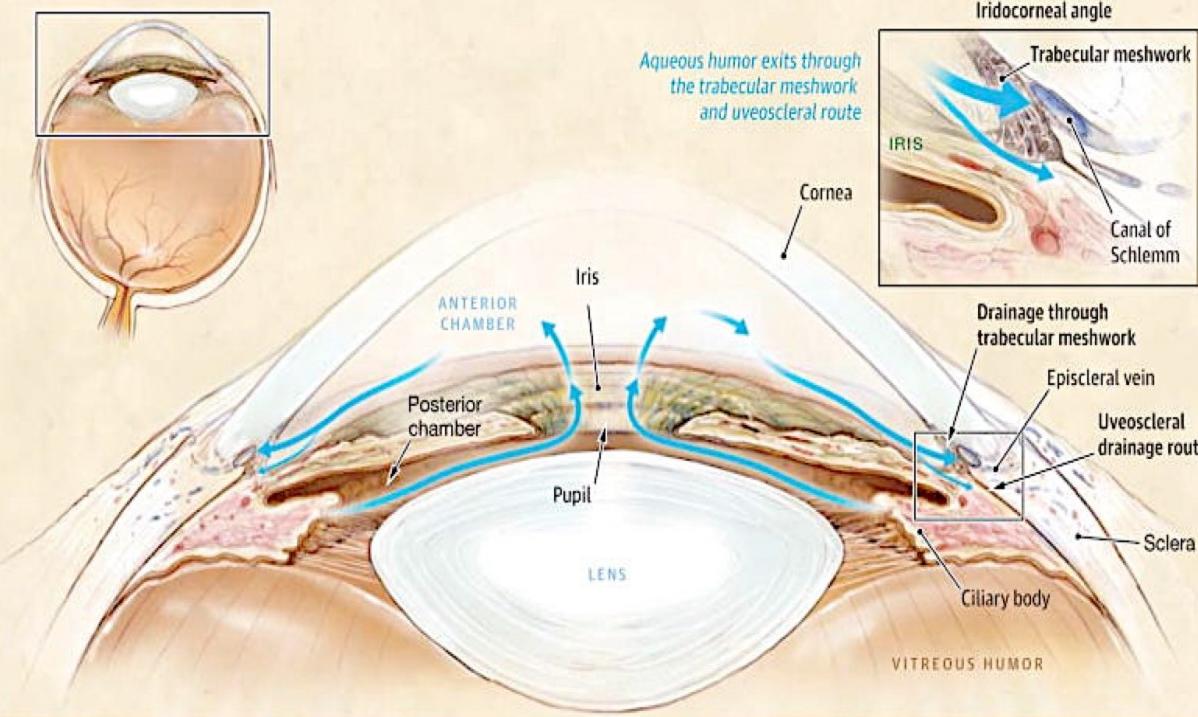


# Acute Glaucoma

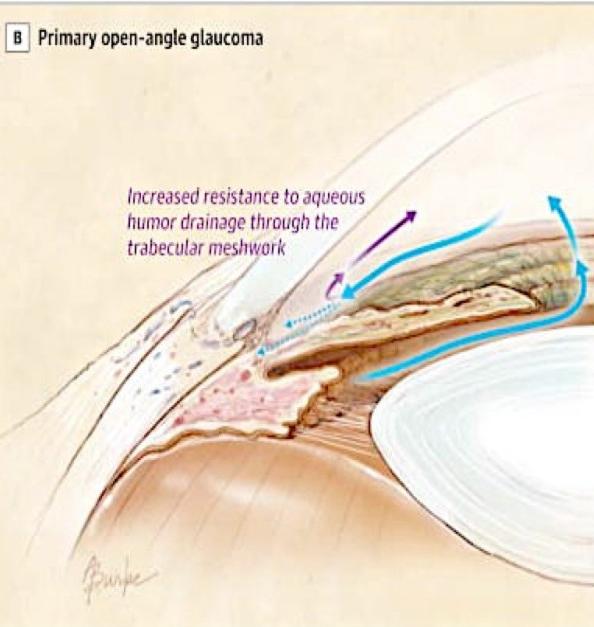
- Acute congestive glaucoma (**angle-closure glaucoma**) is an acute type of increased IOP that occurs in hypermetropes mainly
- Hypermetropes have small eyes with **shallow anterior chamber** and angle
- The pupil can be easily **blocked** by the surface of the lens and the trapped aqueous **pushes the iris forwards** to block the angle → rapid severe rise of pressure → **corneal edema**, and **loss of vision**
- The attack can be **broken** by intravenous **hyperosmotic** in the first 48 hrs. to dehydrate the vitreous and push the lens back



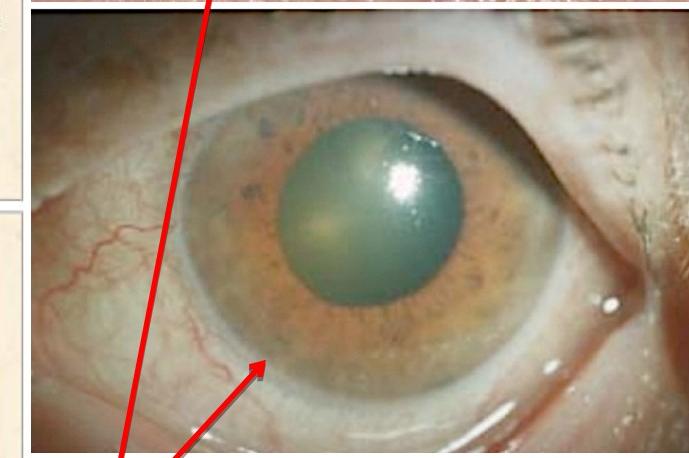
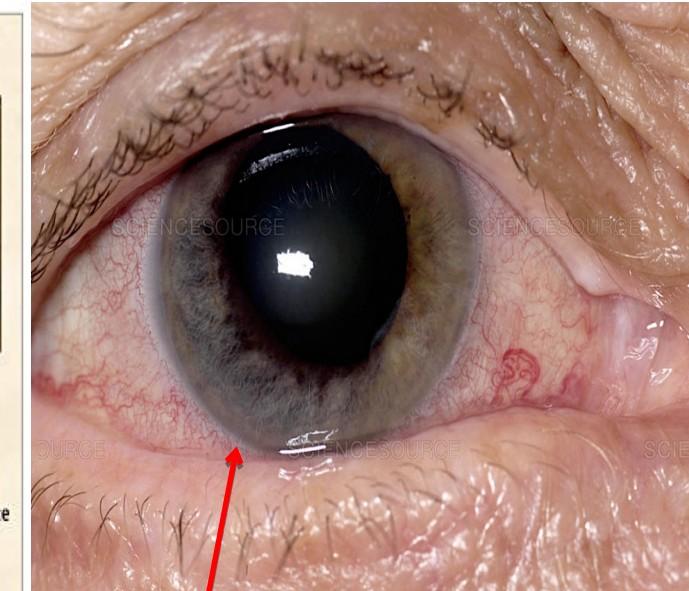
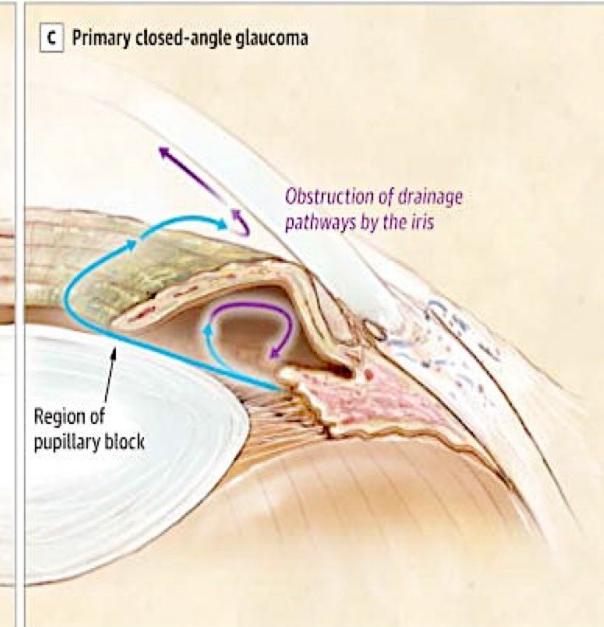
**A Anatomy of healthy eye and aqueous humor drainage pathways**



**B Primary open-angle glaucoma**



**C Primary closed-angle glaucoma**

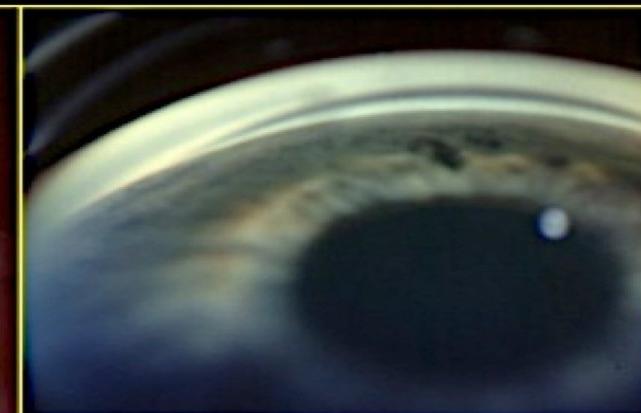
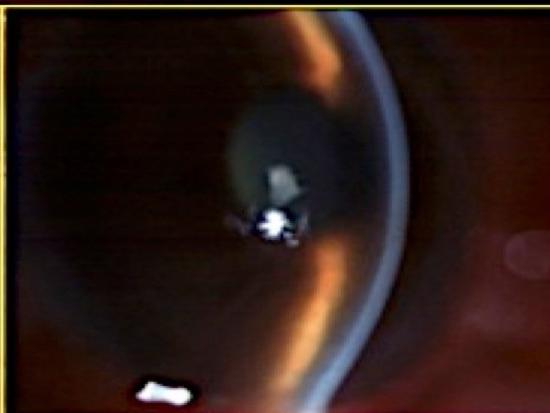
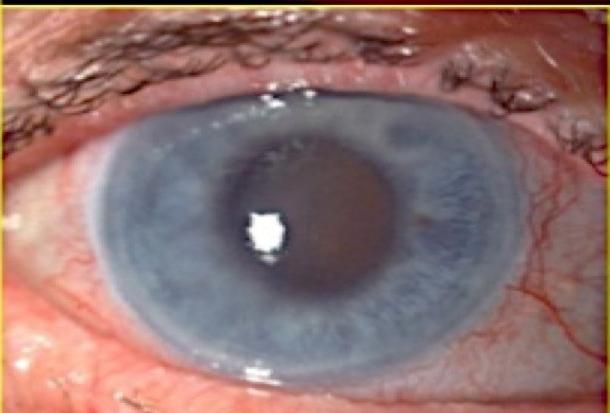


**Red eye with  
dilated pupil and  
shallow AC**



## Acute congestive angle-closure glaucoma

### Signs



- **Miotics** are instilled with **mannitol** to constrict the pupil and topical steroids to reduce inflammation
- Once the attack subsides **PERIPHERAL LASER IRIDOTOMY** is done to prevent further attacks
- **Prophylactic** iridotomy is done in the other eye also
- If treatment is delayed more than 48 hrs. **PAS** may occur and will require filtering surgery (**trabeculectomy**)

# Acute Keratitis

**Inflammations of the cornea can be infective or non-infective**

- Acute infective keratitis (**corneal ulcer**) can be
  - Bacterial
  - Viral (herpes simplex and zoster)
  - Fungal
  - Protozoal (Acanthameba)
- Non-infective ulcers occur with
  - trauma, FB
  - neurotrophic
  - exposure (lagophthalmos)
  - vitamin A deficiency (keratomalacia)
  - collagen diseases
  - severe KCS

# Bacterial Ulcers

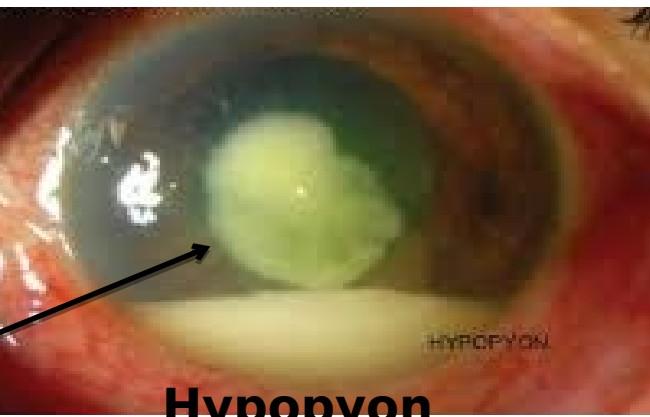
- An **intact** corneal epithelium offers great resistance to infection; **epithelial** loss or **injury** is the first step to corneal infections
- **Many** organisms can infect the cornea so the initial treatment is always **topical broad spectrum antibiotics every 10 minutes**
- A specimen is taken for **culture** and **sensitivity** on **bacterial** and **fungal** media to modify topical treatment
- Severe cases may be augmented by subconjunctival antibiotics



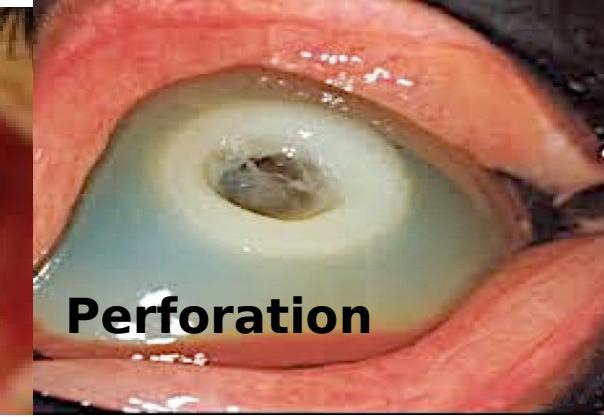
- Many causes are accompanied by **hypopyon** (sterile pus in AC)
- Many complications can occur, the most dangerous is **perforation** which must be **prevented at any cost**
- Resistant ulcers can be treated by additional lines; amniotic membrane, **CXL** and therapeutic keratoplasty
- **All ulcers will end in corneal scars (leucoma)**
- **Treatment** by strong topical antibiotics as **fluoroquinolones** + **cycloplegia** (associated iritis) and patching + pain killers



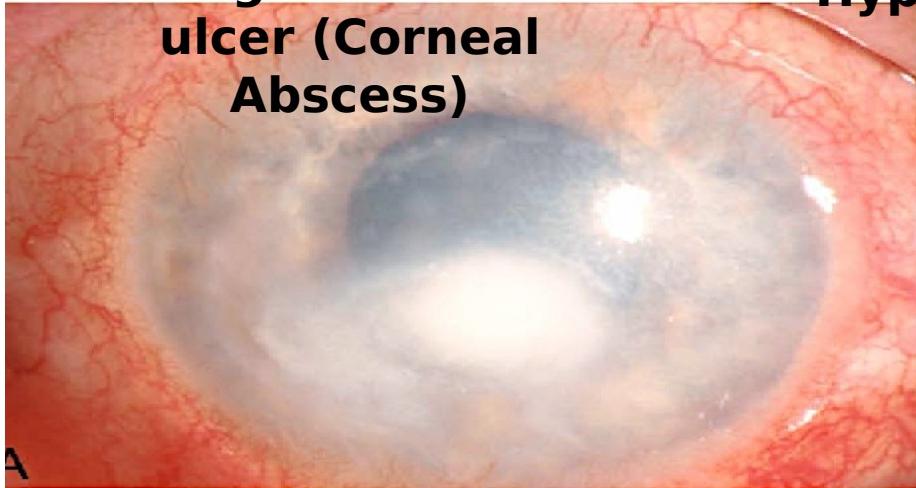
**Large bacterial ulcer (Corneal Abscess)**



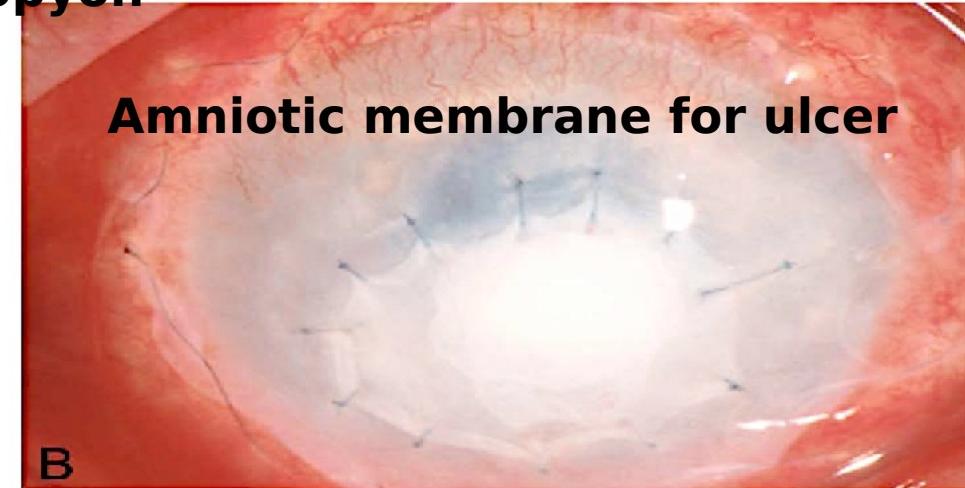
**Hypopyon**



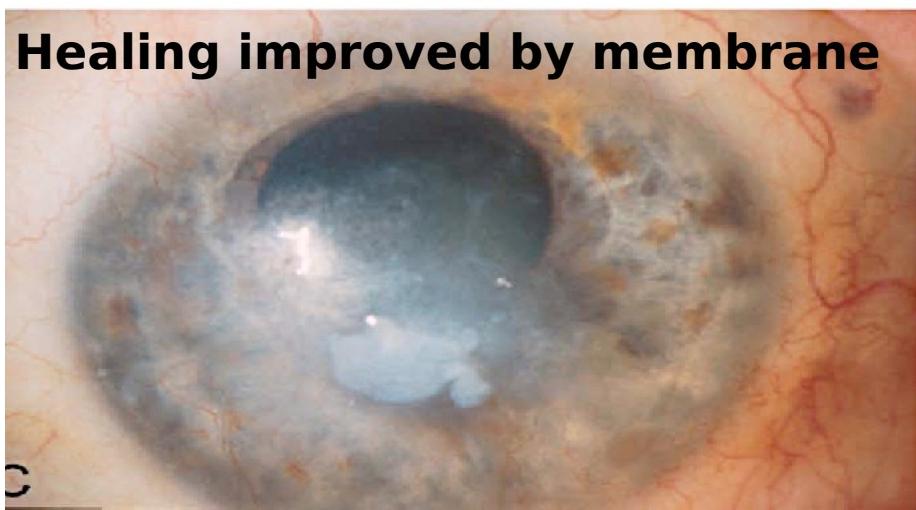
**Perforation**



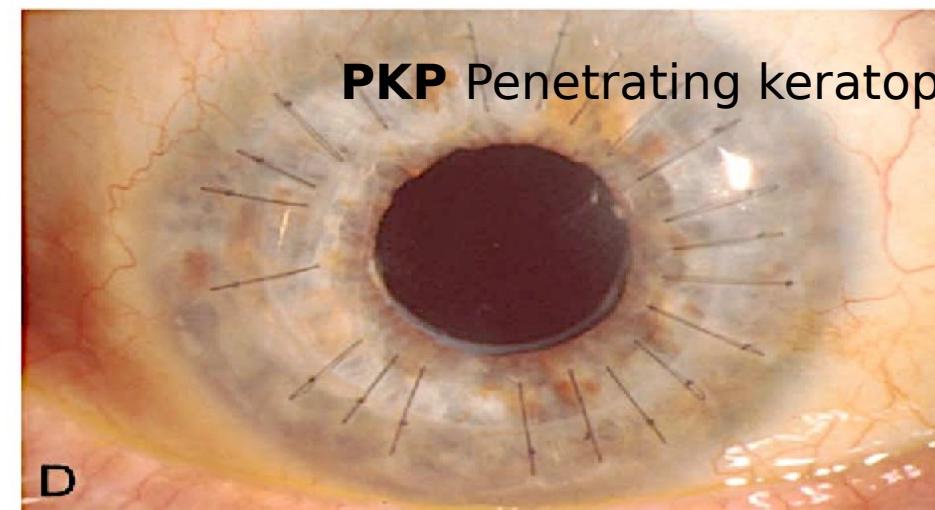
**A**



**B**



**Healing improved by membrane**

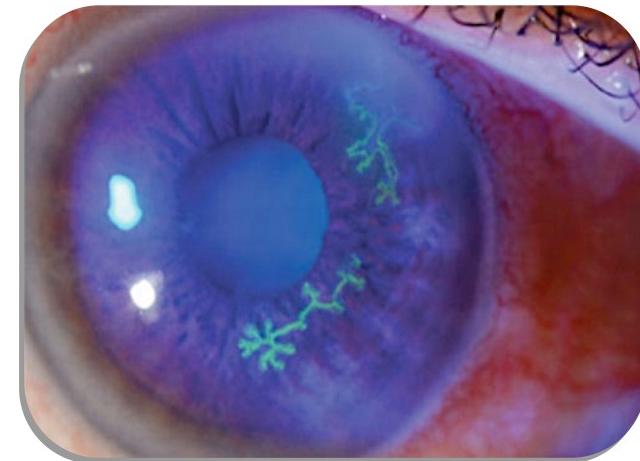


**D**

**PKP Penetrating keratoplasty**

# Viral ulcers

- 2 viruses are usually responsible for corneal infection; **Herpes Simplex** and **Herpes Zoster**, the latter causing much more severe diseases
- Herpes simplex causes a **superficial linear** ulcer that **may** be branching with terminal knobs (**dendritic** ulcer)
- Pain is not severe because the virus causes corneal **hypoesthesia**
- Virus affects young age 15-35 yrs., whereas zoster affects 40-60yrs.



- **Topical steroids** by **mistake** can cause **larger geographic ulcers**
- The ulcer is generally **superficial** and perforation is **rare**  
( except **secondary bacterial infection**, **steroid therapy by mistake**)
- **Stromal disease** may occur in **untreated** virus or in **recurrences** in the form of **disciform keratitis**, **uveitis** and **secondary glaucoma**
- **Treatment** is by **topical acyclovir** (Zovirax) ointment 3%, **oral acyclovir** may be added in **stromal** disease and **uveitis**

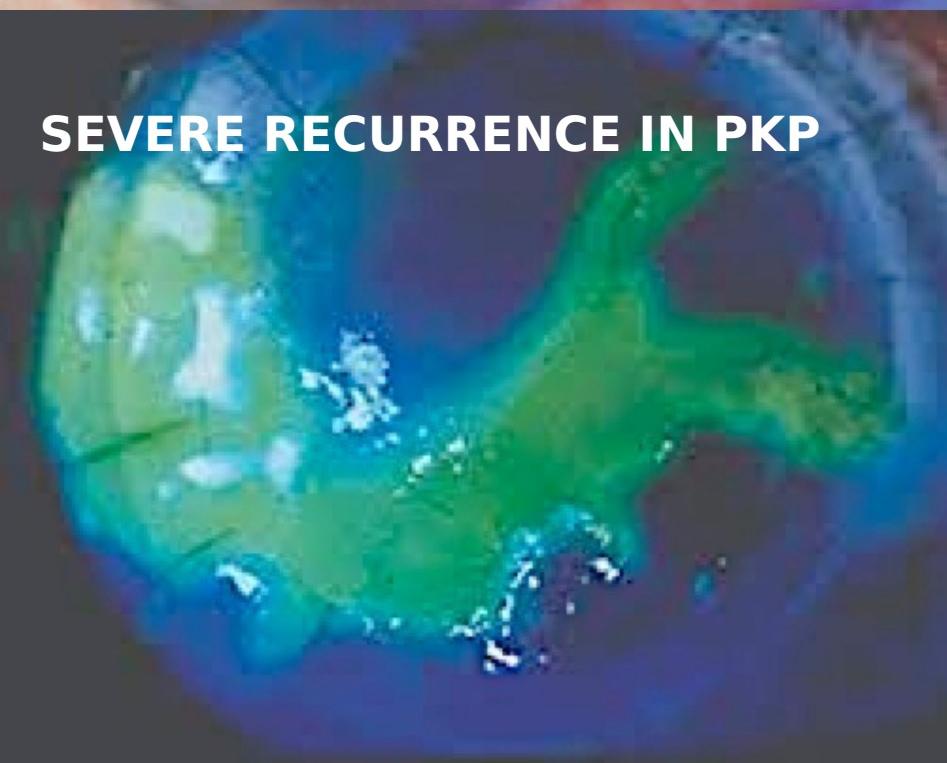
**DENDRITIC ULCER**



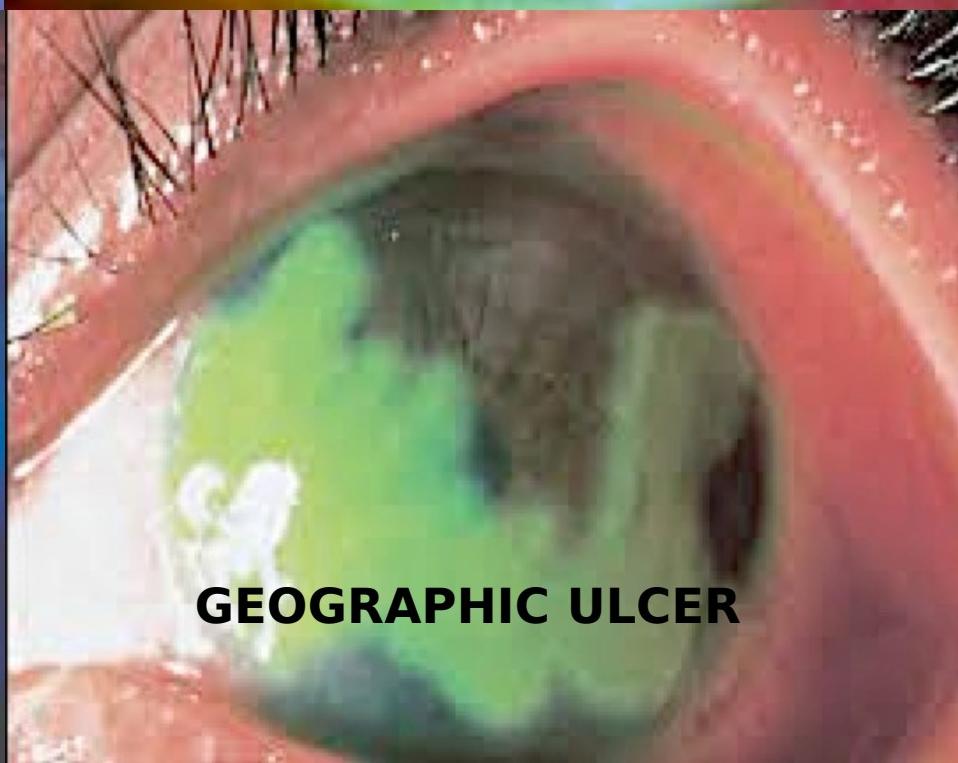
**EXTENSIVE DENDRITES**



**SEVERE RECURRENCE IN PKP**



**GEOGRAPHIC ULCER**



# Herpes Zoster

- Herpes zoster involves the branches of CN:V resulting in **skin blisters** and **ulcers** together with eye involvement
- Eye involvement is usually **severe** with corneal ulcer, stromal disease, uveitis and secondary glaucoma
- Treatment by topical and **oral acyclovir** or **valacyclovir**
- **BOTH** Herpes simplex and zoster can cause **ACUTE RETINAL NECROSIS** in **healthy** young adults.

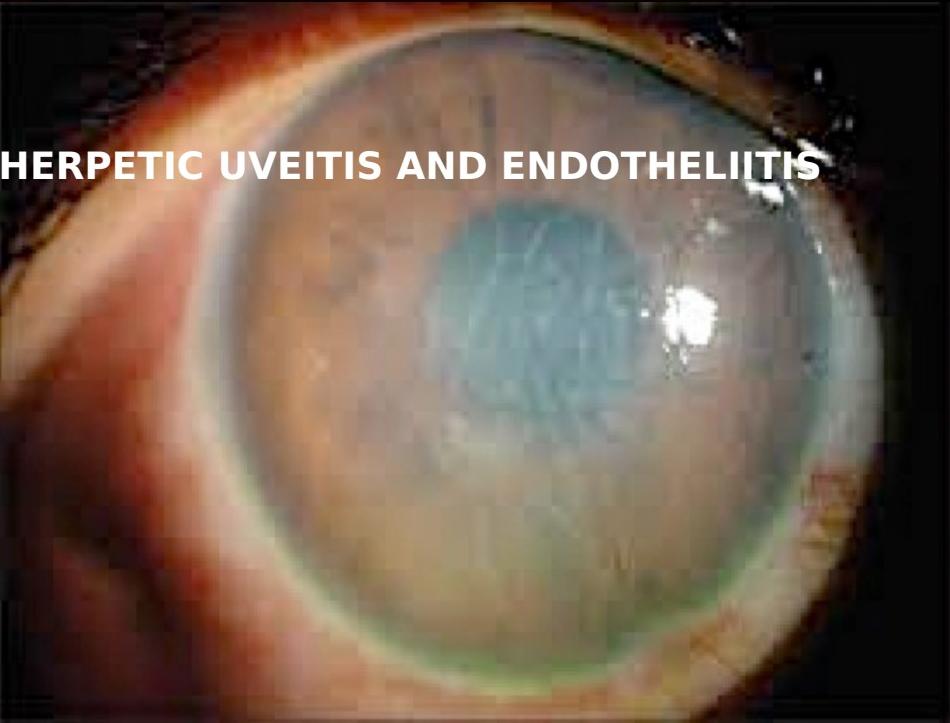




LARGE ELEVATED DENDRITE IN ZOSTER



TROPHIC ULCER

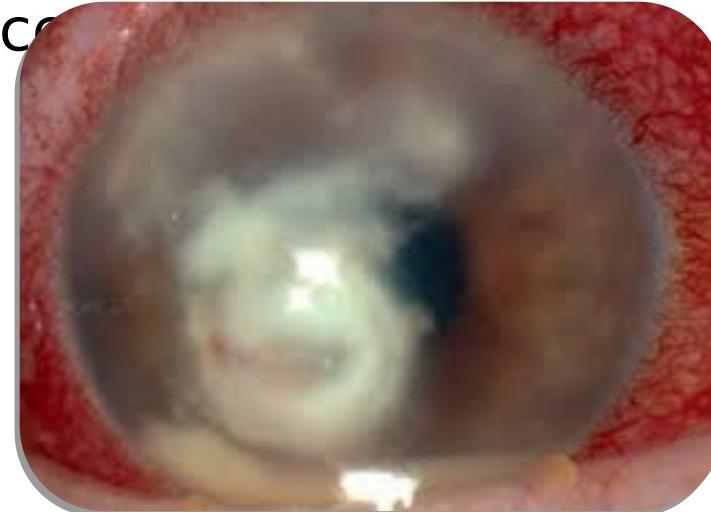


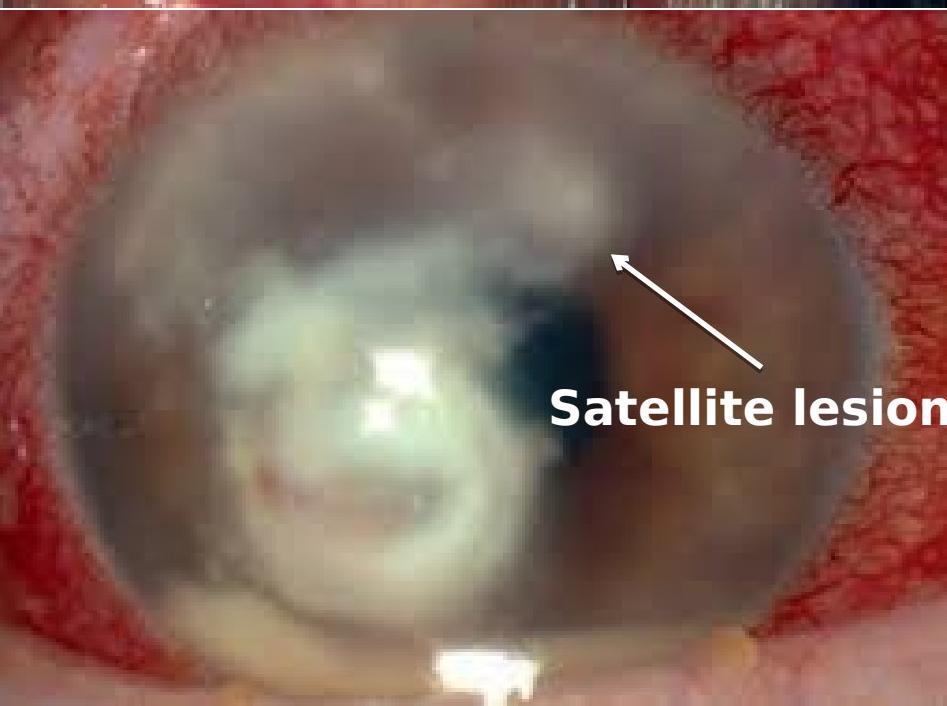
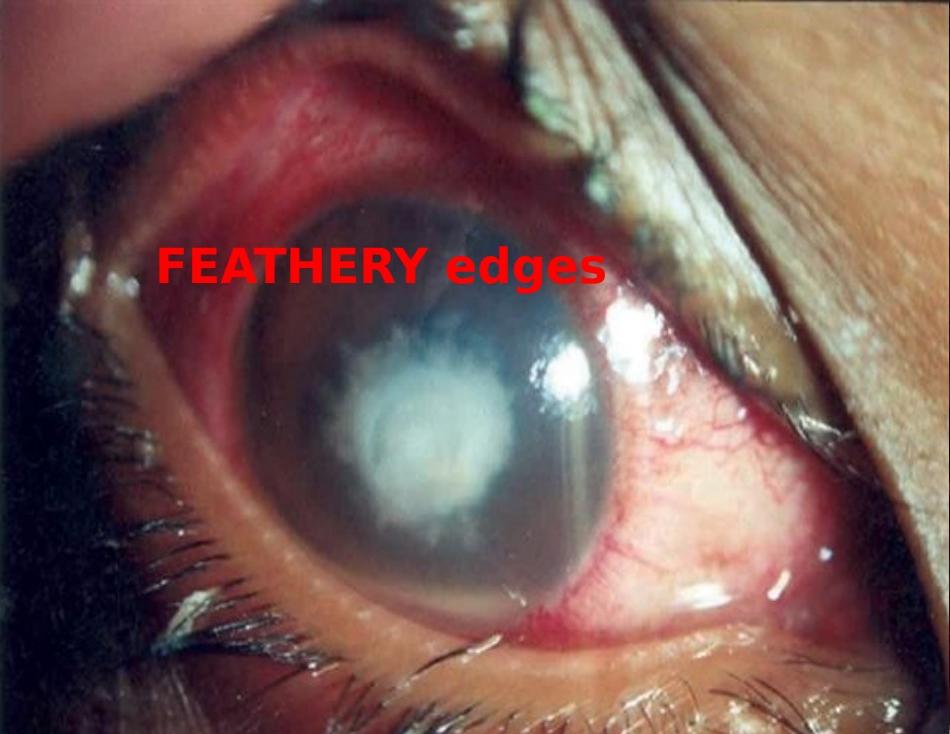
HERPETIC UVEITIS AND ENDOTHELIITIS



# Fungal ulcers

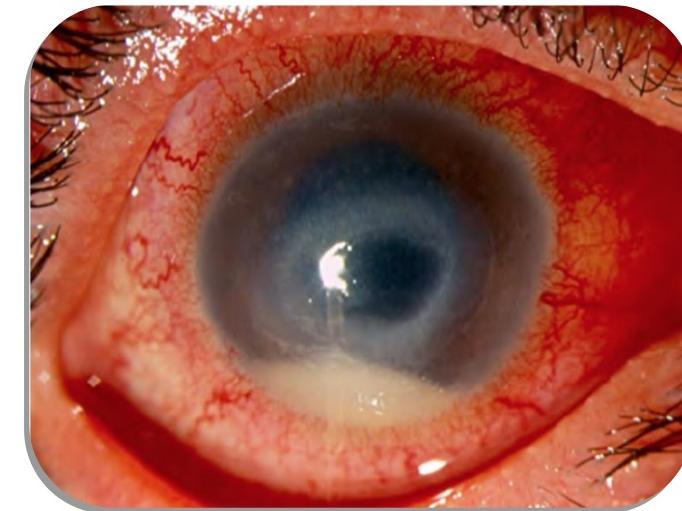
- Fungal infection of the cornea may occur in situations where wounds are contaminated by **plant** and **soil** material
- Fungi may be filamentous or yeast-like
- Ulcers may look bacterial but some have **feathery** edges, **raised** surfaces, dry **plaques** or **satellite** lesions
- Treatment by topical antifungals; **amphotericin** for filamentous and **flucytosine** for yeasts
- Oral voriconazole (**Vfend**) is useful

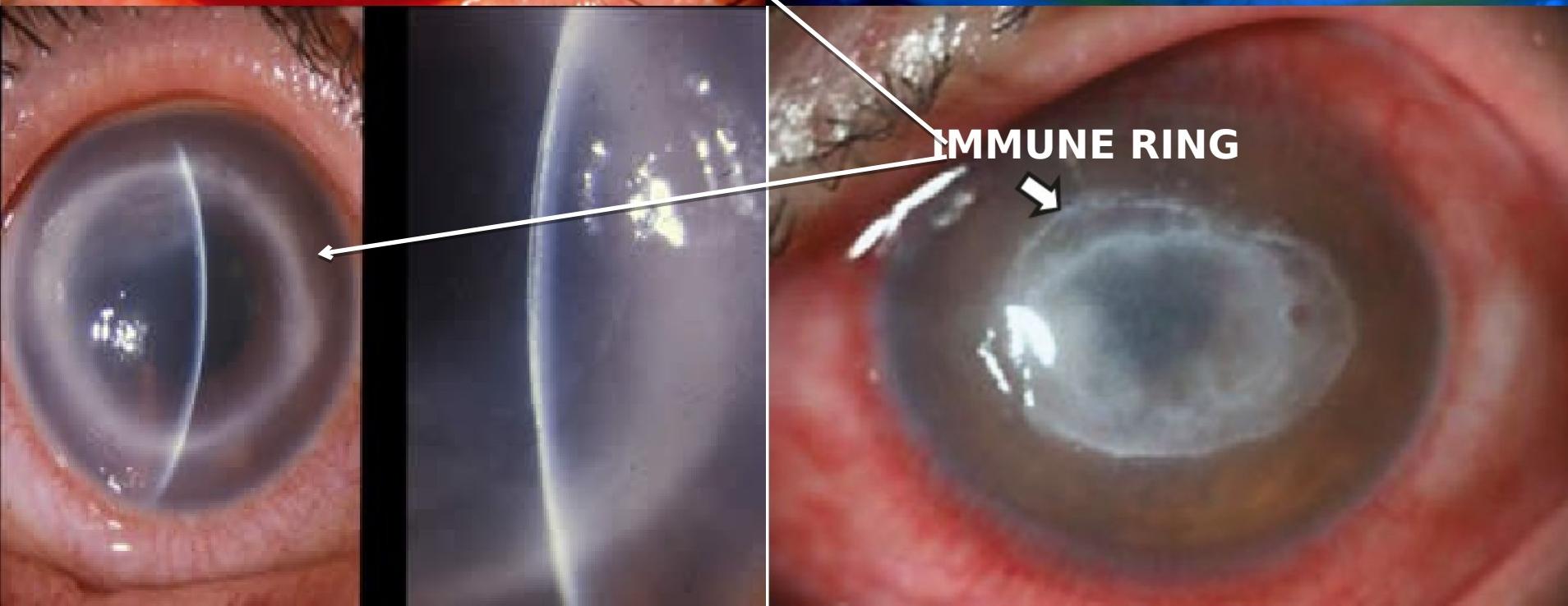
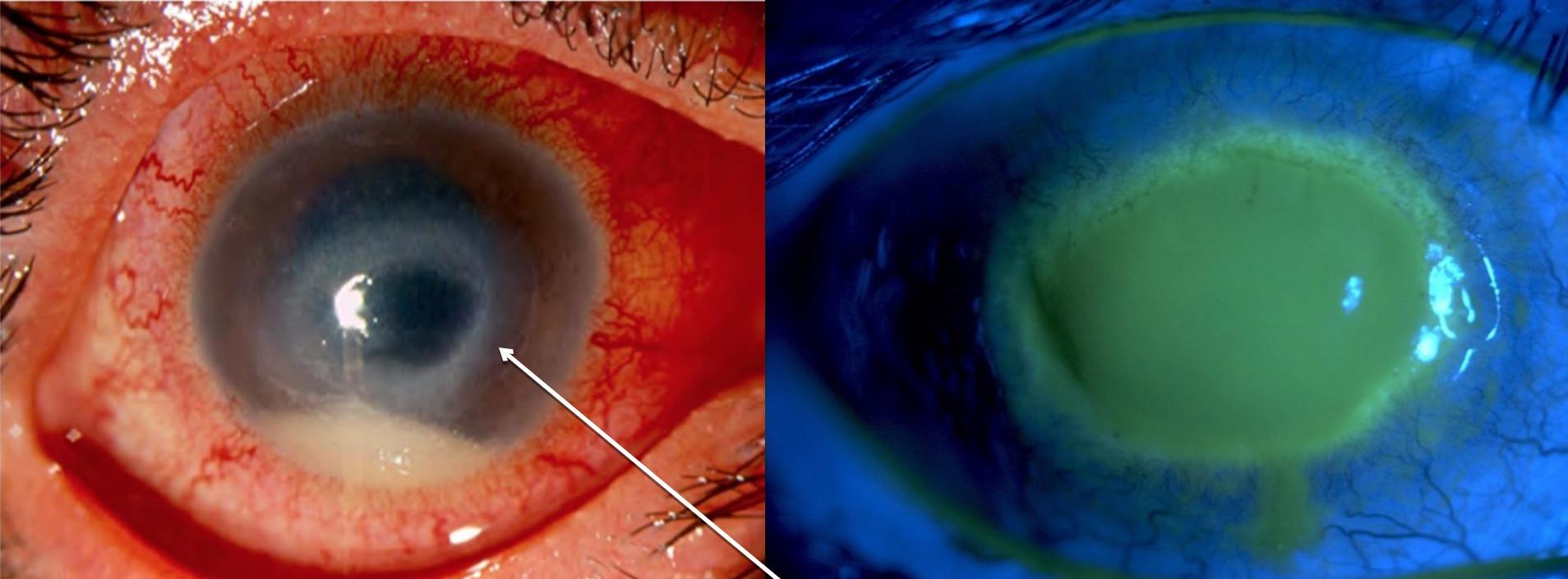




# Acanthameba ulcer

- This protozoon ubiquitous in nature can easily invade the cornea
- A very important **predisposing** factor is wearing contaminated **contact lenses** washed with **tap water or worn in swimming pools**
- **Severe pain ( outweighing signs)**
- **Radial perineuritis** The presence of an infiltrate along the corneal nerves in suppurative keratitis
- **Immune ring**
- Treatment by topical propamidine isethionate (**Brolene**), betadine, neomycin and chlorohexidine



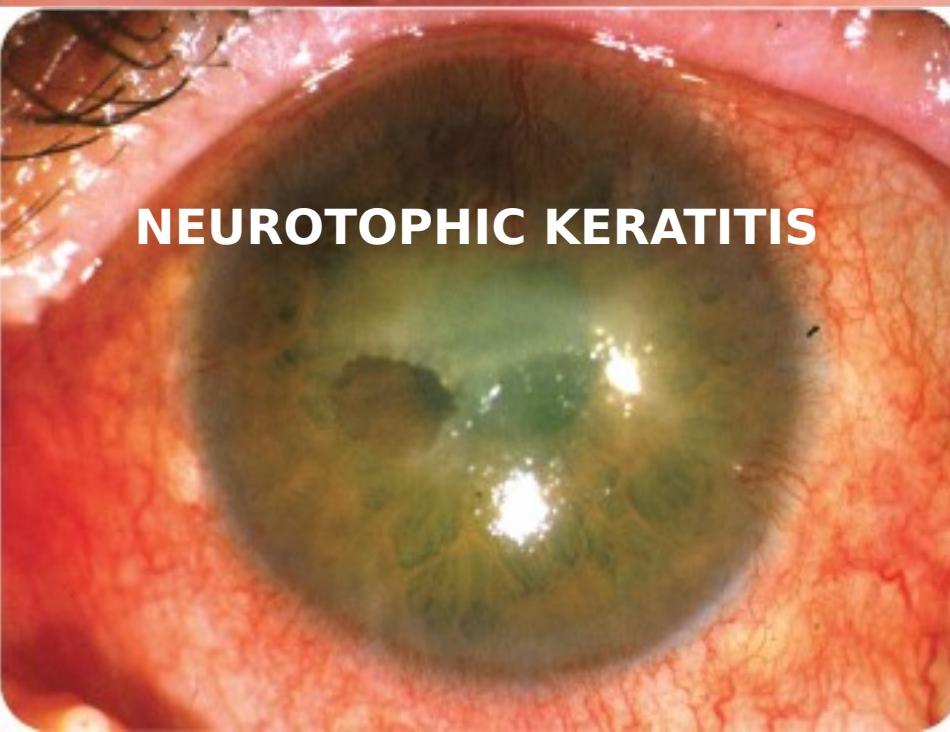
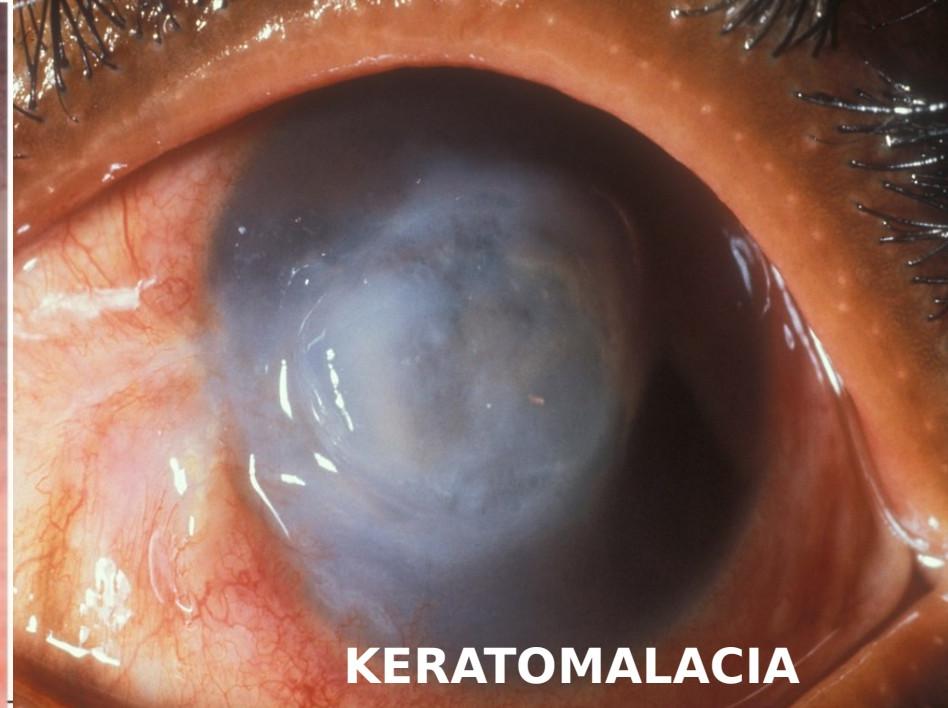
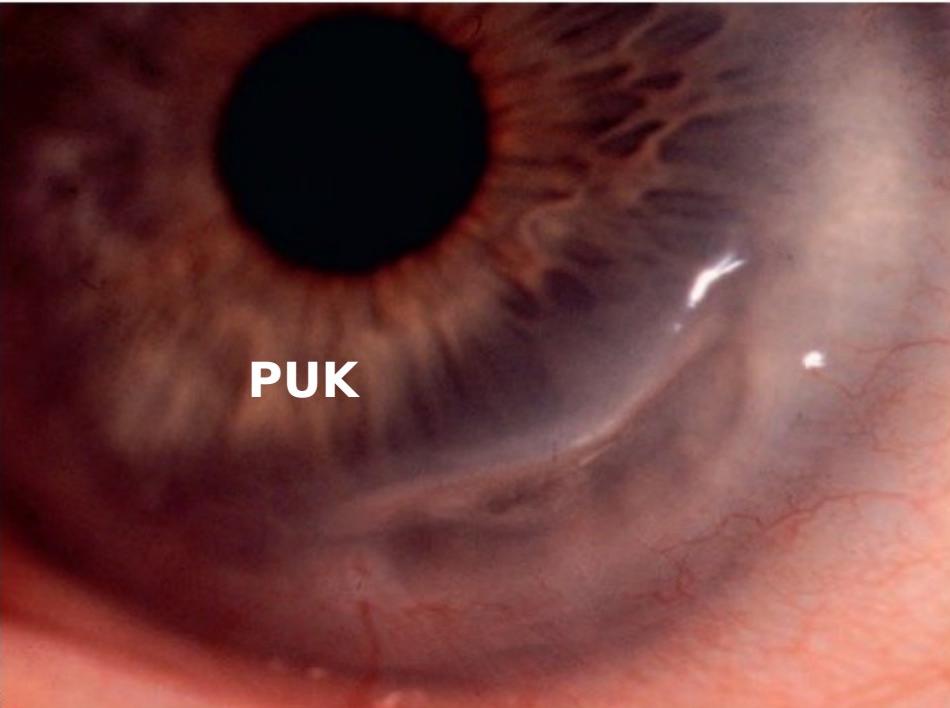


IMMUNE RING

# Non-infective ulcers

- Many **diseases** can cause corneal ulceration
  - **Vitamin A deficiency** (keratomalacia); in infants can be severe leading to bilateral corneal melting, also chronic alcoholism
  - **Exposure keratopathy**; inferior ulcer
  - **Neurotrophic keratopathy**; in 5<sup>th</sup> nerve lesion and acoustic neuroma, a central painless corneal ulcer with mild infiltration
  - **Collagen diseases** can cause peripheral ulcerative keratopathy (PUK) and melting





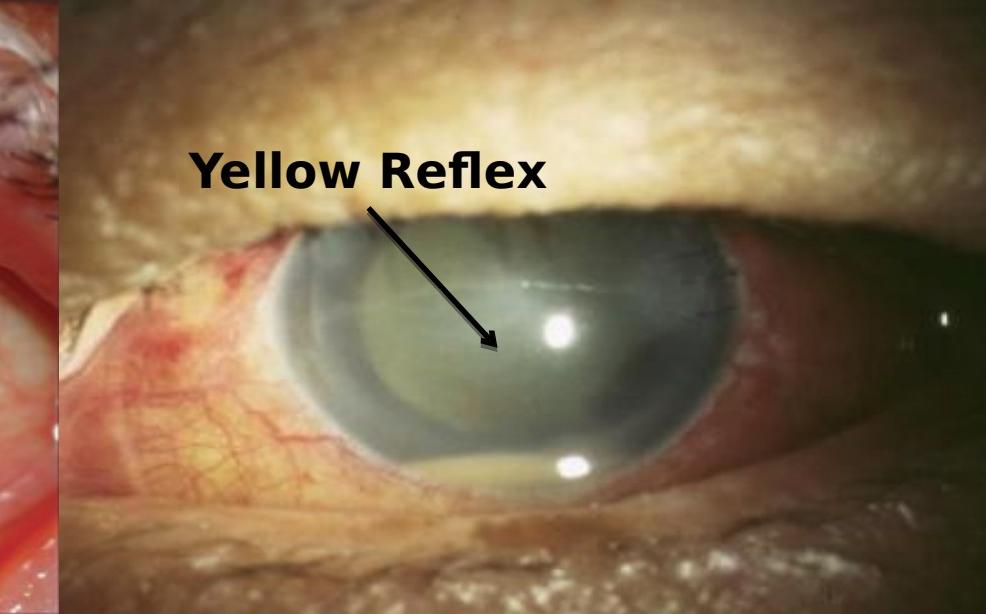
Non - infective Corneal Ulcers

# Acute endophthalmitis

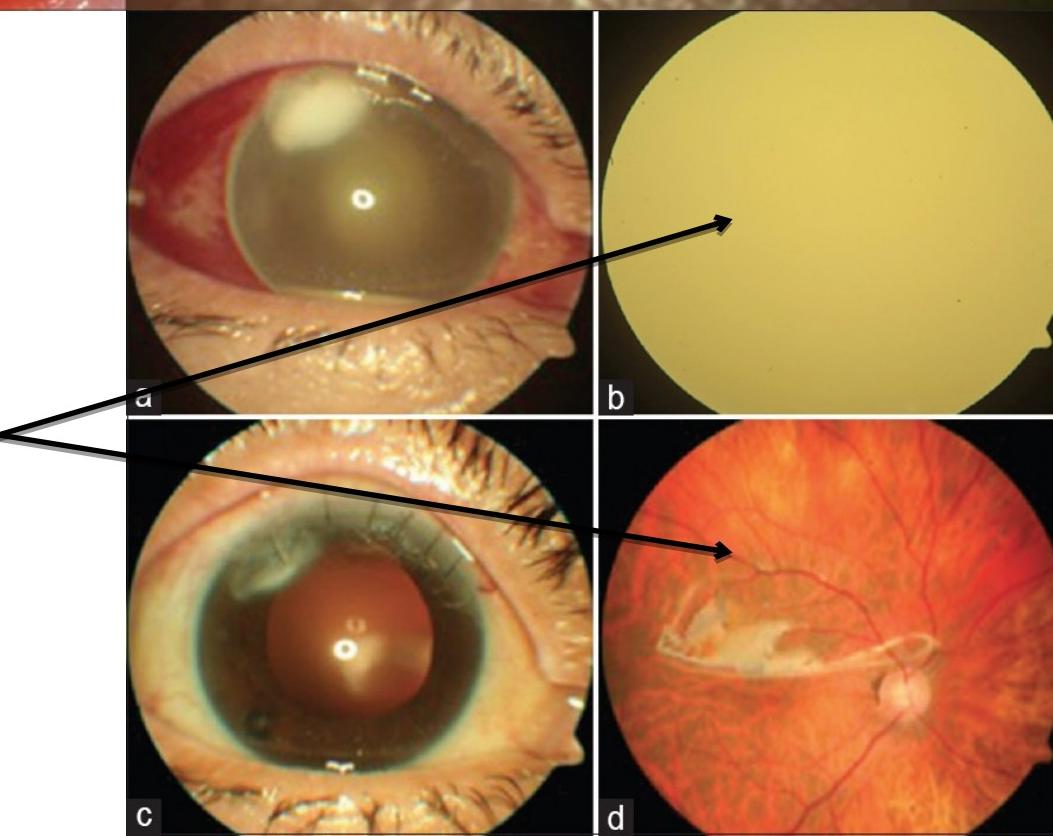
- Infection following surgery or penetrating trauma
- Some cases may occur due to metastatic infection from septic focus as **prostatitis** or **urinary catheters**.
  - Acute drop of vision with pain and **vitritis**
  - AC reaction sometimes with hypopyon
  - Severe cases may show corneal ring abscess
  - Treatment with **intravitreal antibiotic injection** +/- **vitrectomy**



Hypopyon



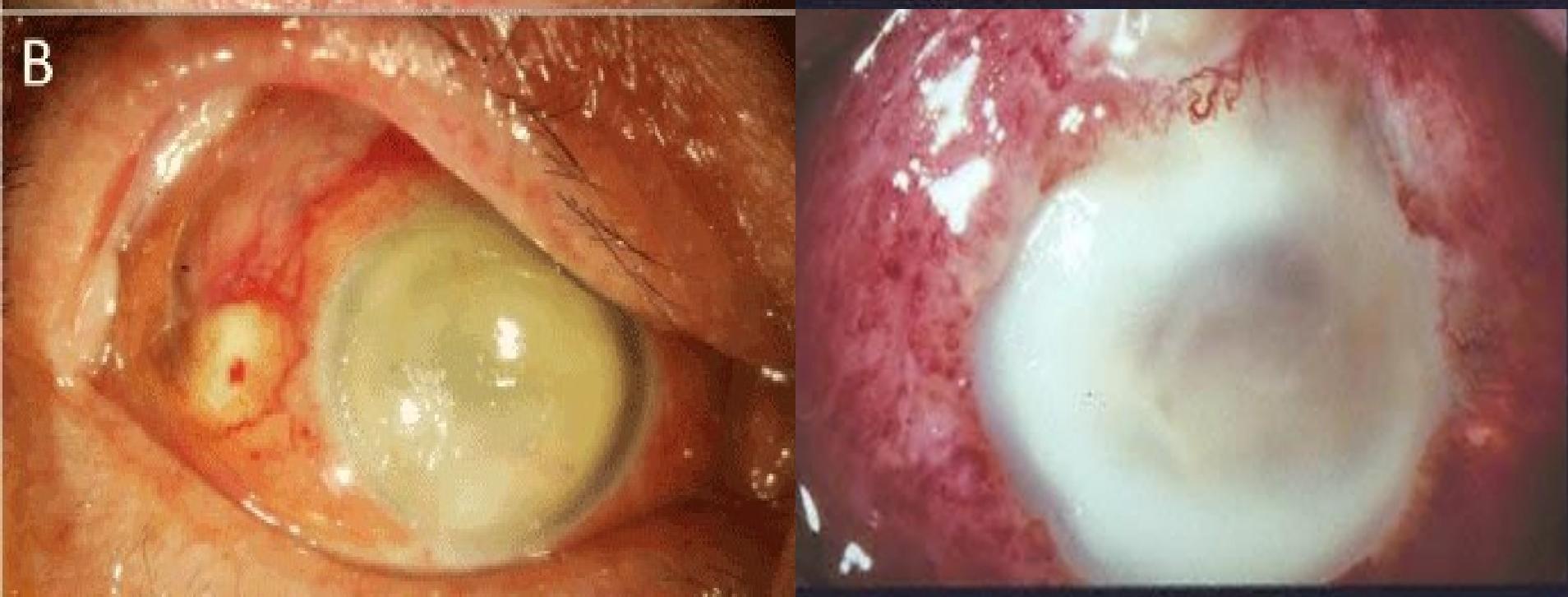
Yellow Reflex



Resolution after  
Intravitreal Antibiotics

# Panophthalmitis

- In severe forms of endophthalmitis esp. post-traumatic
- Inflammation involves the sclera, CT and muscles around the eye
- Picture is severe with pain, **limited motility** and marked chemosis and lid edema
- Picture is like orbital cellulitis but vision is **no PL** from **the start**
- May complicate to cavernous sinus thrombosis. perception of light
- Treatment by **EVISCERATION**



# Symptoms associated with a red eye

- A. Blurred vision (e.g. uveitis & glaucoma).
- B. Photophobia (e.g. keratitis & uveitis).
- C. Colored Haloes (e.g. glaucoma).
- D. Exudation (muco purulent or watering) e.g. conjunctivitis.
- E. Itching (e.g. allergic conjunctivitis).

## **Steps to differentiate the red eye and how to interpret findings**

### **A. Measure central visual acuity.**

### **B. Determine location of redness**

- 1. Subconjunctival hemorrhage**
- 2. Conjunctival hyperemia**
- 3. Ciliary flush\* \* corneal inflammation, iritis, acute glaucoma.**

### **C. Assess discharge and characterize as**

- 1. Profuse or scant**
- 2. Purulent, mucopurulent, or serous**

# **Steps to differentiate the red eye and how to interpret findings**

- D. Assess for corneal opacity\* \*corneal edema, inflammation, ulcer**
- E. Examine for corneal epithelial defect with fluorescein.**
- F. Estimate anterior chamber depth\* \*acute angle closure glaucoma**
- G. Examine pupils\* \*iritis, acute angle closure glaucoma**
- H. Measure intraocular pressure if elevation suspected**

## Determine location of redness

1. Subconjunctival hemorrhage
2. Conjunctival hyperemia
3. Ciliary flush\* \* corneal inflammation, iritis, acute glaucoma.



Sub Conjunctival hemorrhage

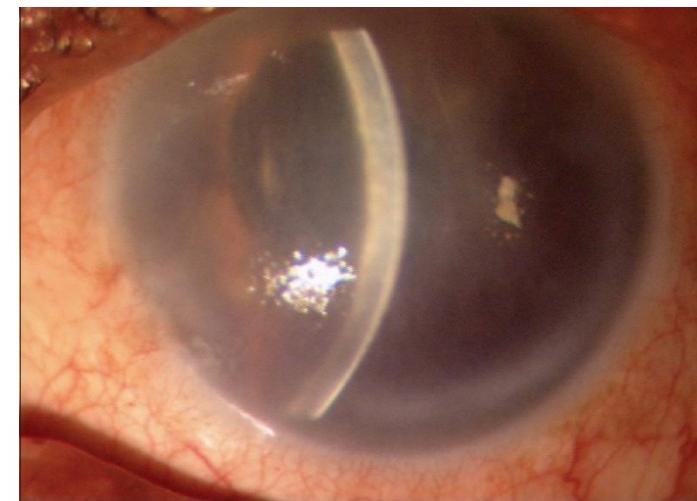
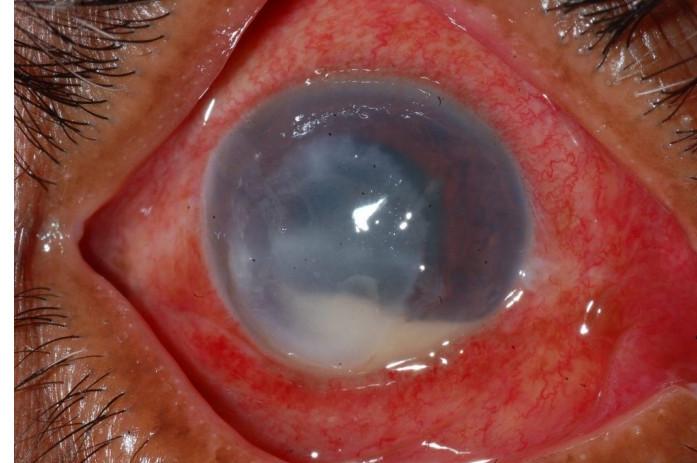


Conjunctival Hyperemia

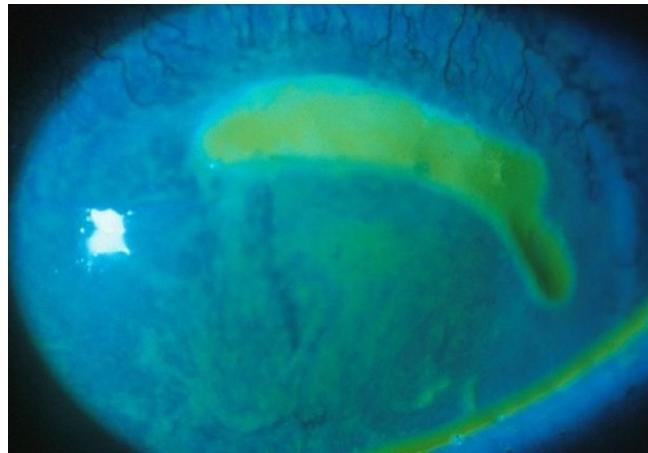


Ciliary Flush

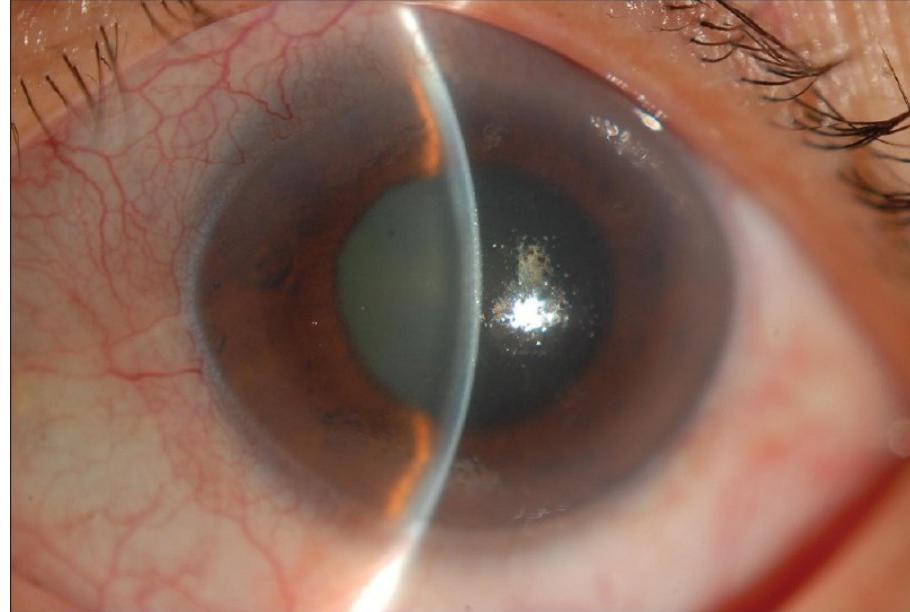
**Assess for corneal opacity\***  
**\*corneal edema, inflammation,  
ulcer**



**Examine for corneal epithelial  
defect with fluorescein.**



**Estimate anterior chamber  
depth\* \*acute angle closure  
glaucoma**



**Examine pupils \* \*iritis, acute  
angle closure glaucoma.**

**Measure intraocular pressure if  
elevation suspected**

